Protecting Our Community From Environmental Hazards

The New River Valley consists of a diverse population nestled in the cradle of a primarily agrarian economy. Because of its rural character, the New River Valley has begun to draw people and industry from urban areas. Such growth has, and will, continue to bring increasing strain on consumer health and environmental quality. Amidst these changes and growth, the New River Health District will continue to preserve, promote, and protect this environment for all residents to enjoy for years to come.

Growth brings increased environmental impacts and public concerns in many areas including water quality, wastewater disposal, communicable disease transmission, and child health safety. Many of our environmental indicators present a unique challenge in measuring their contribution toward health outcomes. Unlike other indicators of health status that can be associated with a single agent of causation or at risk behaviors, environmental indicators measure the quality of our underground aquifers, watersheds, and disease prevalence that do not recognize geopolitical boundaries. The impact of environment on health outcome cannot be readily identified, in most cases, except through population-based studies. Environmental surveillance requires a collaborative approach involving interagency and intergovernmental cooperation if our goals are to be addressed effectively. The reduction in the incidence of communicable and infectious diseases is a significant public health achievement in this century. Despite the major progress that has been made, infectious diseases remain an important cause of illness and death in this country. New River Valley residents were reminded of the importance of the surveillance for infectious diseases during the 1996 *Legionella* outbreak in our community. The diligent and ongoing surveillance for infectious and communicable diseases is paramount to control efforts.

The New River Health District utilizes several strategies to manage current and anticipated issues. These strategies include a combination of educating, inspecting, enforcing, monitoring, and planning. In this way, the spread of rabies can be controlled, elevated blood lead levels in children can be prevented, and an adequate and potable drinking water supply can be ensured and made available for all residents of the New River Valley.

Water Supply Systems and Wastewater Disposal Systems

Objective: Increase to at least 70% the proportion of people who receive a supply of drinking water that meets the safe drinking water standards established by the Environmental Protection Agency.

Drinking water is supplied to 200 million Americans (approximately 80% of the population) by 58,000 community (public) water systems and to nonresidential locations such as campgrounds, schools, and factories by 160,000 small-scale suppliers (serving between 25 and 3,300 people). The remainder of the population is served by private wells, surface water, cisterns, and springs.

The Safe Drinking Water Act (SDA) amendments have directed the Environmental Protection Agency (EPA) to set standards or Maximum Contaminant Levels (MCL) for 83 specific drinking water contaminants for all community water systems. These MCL standards define acceptable levels of contaminants. MCL is the maximum permissible level of any contaminant. Primary Maximum Contaminant Levels (PMCL) are maximum permissible levels of contaminants which would adversely affect our health. These contaminants are identified through routine water sampling and testing. The SDA requires that water treatment plant employees and health department personnel collect water samples on a routine basis from water treatment plants and residents who are connected to water distribution systems serving the community. For residents who have a private well, spring, or cistern, routine periodic water sampling and testing is optional; however, sampling of private water systems may be done upon individual request.

According to SDA requirements, the number and frequency of water samples collected are based on the population served. The following table reflects the number of community (public) water systems and the number of samples collected, as well as those samples which exceeded the maximum contaminant level and primary maximum contaminant level standards for 1994 through June 30, 1997, in the New River Health District by locality.

Number of Community (Public) Water Systems and Number of Samples Collected
New River Health District
January, 1994 - June, 1997

		1994		1995		1996		Jan-June, 1997		
Locality	Number of Community Water Systems	Number of Samples Collected	Samples with one or more elements Exceeding PMCLs	Number of Samples Collected	Samples with one or more elements Exceeding PMCLs	Number of Samples Collected	Samples with one or more elements Exceeding PMCLs	Number of Samples Collected	Samples with one or more elements Exceeding PMCLs	Number of Samples Required (1997)
Floyd	14	186	0	196	0	236	1	180	3	152
Giles	23	627	0	628	0	654	1	451	0	404
Montgomery	29	741	0	832	5	880	2	505	0	784
Pulaski	24	539	0	556	1	622	2	436	0	560
Radford	1	180	0	180	0	180	0	90	0	180

Source: Office of Water Programs, Virginia Department of Health, 1997.

According to the Office of Water Programs (OWP), Montgomery County, with 29 community water systems, not only collects the most samples, but also has had the highest number of samples (7) with one or more single contaminant elements reported to exceed specific PMCLs since 1994. Radford City, with only one public water system, has had no reported samples that exceeded one or more specific PMCLs; Giles County, with 23 community water systems, had only one reported sample exceeding one or more specific PMCLs; whereas Pulaski County, with 24 community water systems, had three samples reported to exceed one or more specific PMCLs during the 1994 - 1997 time period. Of the total 2,080 required water samples collected in the New River Health District from 91 community water systems in 1994 - 1997, only 15 samples, or less than 1%, had one or more single contaminant elements reported to exceed specific PMCLs.

Other environmental health indicators are the numbers of individual water supply systems and wastewater (sewage) disposal systems in the District. Where there is no public water or sewer to serve residents, individuals must construct individual wells, cisterns, or develop springs, and install septic tanks/drainfields. For every well that is drilled into an aquifer or for every sewage disposal system that is installed, there exists the potential for pollutants to enter the aquifer and contaminate the groundwater. Evaluation of soil suitability to filter impurities, proper installation of septic tanks/drainfields, and routine maintenance of septic tanks, as well as proper well placement and construction, help minimize contaminant migration into groundwater. The following table illustrates the diversity of water sources that supply housing units by locality in the New River Health District.

Water Supply Systems
New River Health District and Localities
1997*

	NRHD	*Floyd*	*Giles*	*Montgomery*	*Pulaski*	*Radford*
Total Housing Units	**60,609**	**5,505**	**7,098**	**27,770**	**14,740**	**5,496**
Housing Units on Public Water	**40,947**	**441**	**3,927**	**20,731**	**10,382**	**5,466**
Percent of Housing Units on Public Water	**68%**	**8%**	**56%**	**75%**	**70%**	**99.5%**
Housing Units on Drilled Wells	**13,941**	**3,005**	**1,664**	**5,766**	**3,486**	**20**
Percent of Housing Units on Drilled Wells	**23%**	**55%**	**23%**	**21%**	**24%**	**0.4%**
Housing Units on Dug Wells	**1,008**	**239**	**98**	**408**	**263**	**0**
Percent of Housing Units on Dug Wells	**1%**	**4%**	**1%**	**1%**	**2%**	**0%**
Housing Units with Other Water Sources	**4,713**	**1,820**	**1,409**	**865**	**609**	**10**
Percent of Housing Units with Other Water Sources	**8%**	**33%**	**20%**	**3%**	**4%**	**0.1%**

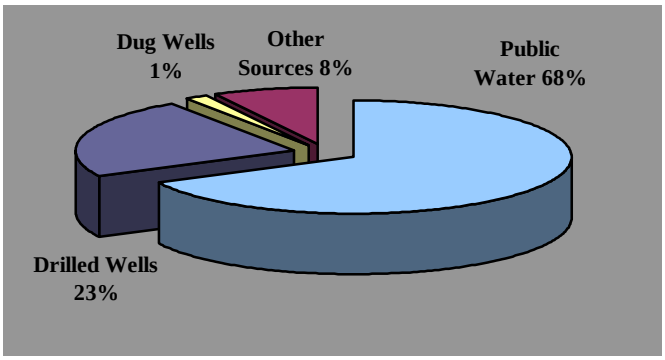
* Based on 1990 Census.
Source: New River Valley Planning District Commission, June 1992.

The following graphs show the percent distribution of drinking water sources by housing unit in the New River Health District--those utilizing either community (public) water, individual drilled wells, dug wells, or other sources of drinking water such as cisterns or springs. The District has 68% or 40,947 housing units connected to a public community water system. Drilled wells account for 23%, and hand-dug wells account for 1%. There are still 5,721 or 9% of housing units throughout the District that use some other source of water for drinking such as a spring or cistern. Thirty-two percent (32%) of housing units in the New River Health District are on private water supplies and, consequently, are not sampled under the Safe Drinking Water Act requirements. These housing units may be at a higher risk for waterborne illness.

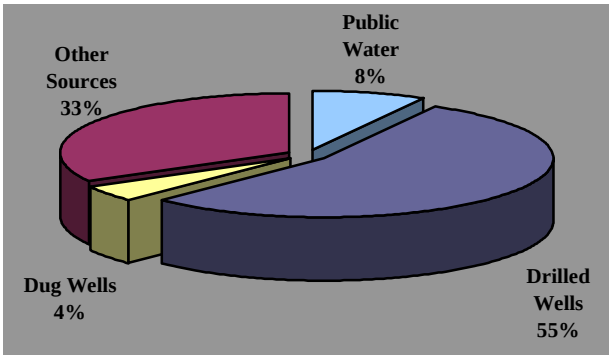
In the following graphs, it is interesting to note that Radford City has the most housing units on approved community (public) water systems (100%), while Floyd County has the least (8%). Montgomery County has 75% of its housing units on community water supplies, Pulaski County has 70%, and Giles County has 56%.

Percent of Housing Units with Community (Public) Water Systems, Private Wells, and Other Sources
New River Health District and Localities
1997*

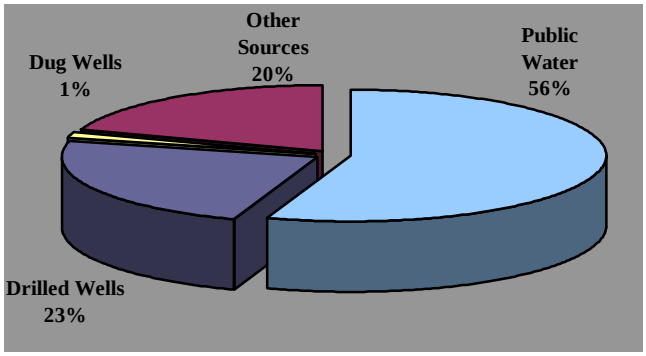
New River Health District



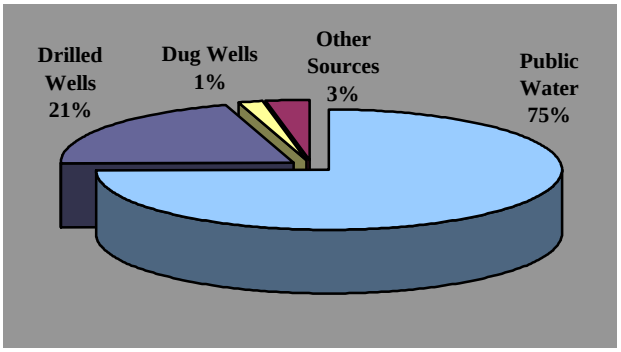
Floyd County



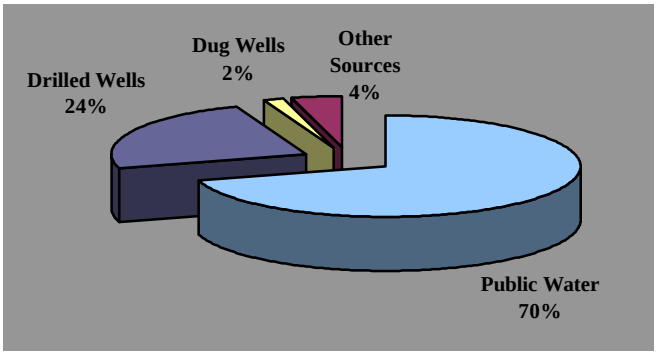
Giles County



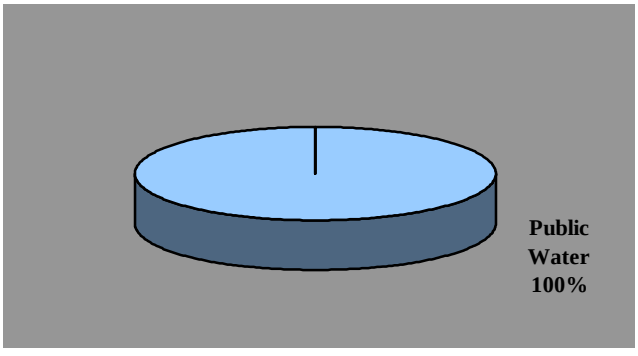
Montgomery County



Pulaski County



Radford City



* Based on 1990 Census.
Source: New River Valley Planning Commission, June 1992.

Localities in the District do not always provide community water and sewer systems simultaneously to their customers. The size of a water or sewer treatment plant determines how many customers each treatment plant can adequately serve. Housing units may be connected to a community water system; but if a centralized sewer system is not available or not sized sufficiently, a homeowner must install a septic tank and drainfield or sewage disposal system.

There are 32,899 housing units or 54% of the District's total housing units on public sewer as seen in the following table and graphs. The wastewater and sewage system sources in the New River Health District vary by locality as illustrated in the following graphs. These graphs illustrate, by District and locality, the percent distribution of housing unit wastewater disposal methods--either public sewer, septic tank or cesspool, or other means of sewage disposal such as pit privies and sand mounds. As can be seen in these graphs, Radford City has the largest percent (97%) of housing units on public sewer, and Floyd County has the least percent (7%) of housing units on public sewer. Montgomery County has 65% of housing units connected to public sewer, Pulaski County has 43%, and Giles County has 36%.

Wastewater (Sewage) Disposal Systems
New River Health District and Localities
1997*

	NRHD	*Floyd*	*Giles*	*Montgomery*	*Pulaski*	*Radford*
Housing Units on Public Sewer	**32,899**	**410**	**2,560**	**18,188**	**6,383**	**5,358**
Percent of Housing Units on Public Sewer	**54%**	**7%**	**36%**	**65%**	**43%**	**97%**
Housing Units with Septic Tanks or Cesspools	**26,028**	**4,622**	**4,277**	**9,088**	**7,908**	**133**
Percent of Housing Units with Septic Tanks or Cesspools	**43%**	**84%**	**60%**	**33%**	**54%**	**2%**
Housing Units with Other Means of Sewage Disposal	**1,682**	**473**	**261**	**494**	**449**	**5**
Percent of Housing Units with Other Means of Sewage Disposal	**3%**	**9%**	**4%**	**2%**	**3%**	**<1%**

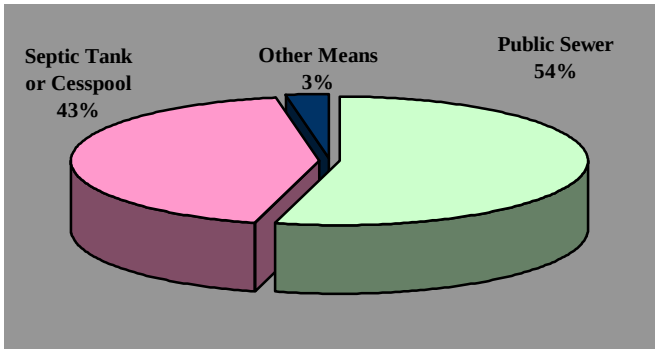
* Based on 1990 Census.
Source: New River Valley Planning District Commission, June 1992.

Safe drinking water can only be achieved by routine testing and sampling of treated water provided by public drinking water supplies. As septic systems continue to be installed in areas where public sewer does not exist, a greater potential for contamination of the groundwater will occur. Septic systems, alternatives, and other on-site means of sewage disposal are only a temporary means of wastewater disposal. A balance of both public water and public sewer must be met to protect the groundwater and, ultimately, to assure safe drinking water.

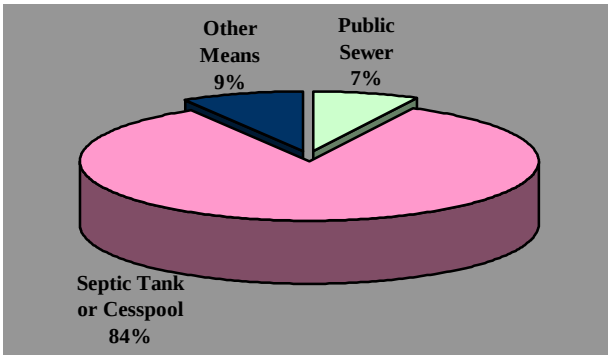
The ultimate goal of public sewer is to provide effective transportation of wastewater and sewage to a treatment facility. The treated discharge can then be monitored to ensure that groundwater will be protected at all times. More stringent safe drinking water standards and mandated testing of more substances in drinking water will protect aquifers from sources of pollution and contamination. Poorly installed or maintained septic systems can pollute groundwater, especially in areas such as the New River Health District where there is karst terrain. Assurance of safe drinking water can only be accomplished if both public water and public sewage systems exist. This further allows for proper sewage treatment, thereby preventing contamination of the groundwater.

Percent of Housing Units with Public Sewers, Septic Tanks or Cesspools, or Other Means of Sewage Disposal New River Health District and Localities 1997*

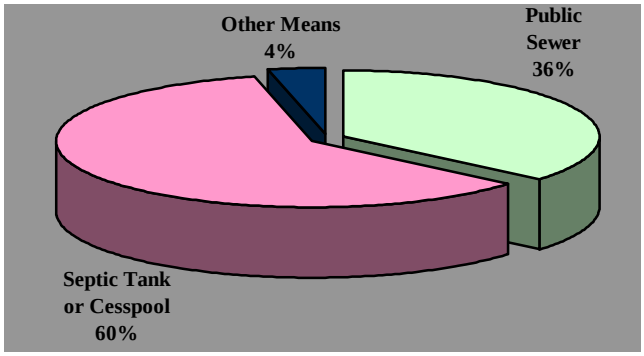
New River Health District



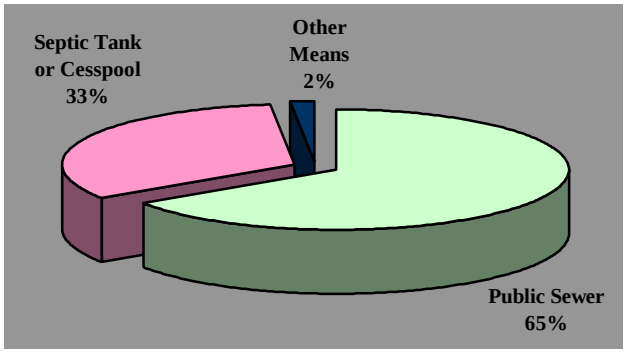
Floyd County



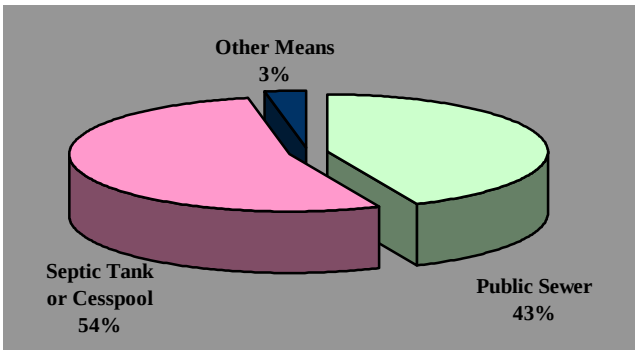
Giles County



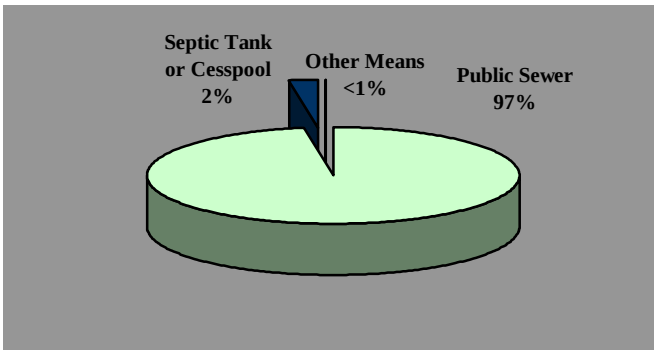
Montgomery County



Pulaski County



Radford City



* Based on 1990 Census.
Source: New River Valley Planning Commission, June 1992.

What you can do:

- **Become knowledgeable and educate others about appropriate ways of disposing toxic and chemical wastes in a safe and sanitary manner.**
- **Routinely sample your well water--preferably, twice a year.**
- **Learn how to properly maintain your septic system.**
- **Promote the extension of public water and sewer systems rather than individually drilled wells and installed septic systems.**

Rabies Prevention

Rabies is a viral disease only found in mammals. It is caused by a virus that attacks the nervous system. The rabies virus is found in the brain and saliva of rabid animals and is most often spread through a rabid animal bite. It can also be contracted by getting saliva or brain tissue of a rabid animal in your eyes or mouth or into a wound. Rabies has been found in bats, foxes, raccoons, skunks, cats, dogs, and in some farm animals. Rabbits, squirrels, rats, mice, and pets, such as gerbils and hamsters, rarely get rabies. Birds, fish, reptiles, and amphibians do not get the disease. Rabies is almost always fatal to any human or mammal that contracts the disease. Once a human is exposed to rabies, the individual can be treated with a series of preventive shots. However, without treatment, rabies can kill. Human rabies cases in Virginia and the Nation dropped dramatically in the 1950s because transmission of rabies from dog to dog (and then to humans) was controlled with effective canine rabies vaccines and enforcement of stray dog regulations. However, rabies among cats now presents a challenge. In 1996, Virginia reported a record high of 29 rabid cats. The number of rabid cats is of extreme concern since cats are ranked fourth in contributing to the number of rabies cases, whereas dogs are seventh in Virginia.

In the United States, there were 7,877 animal rabies cases reported in 1995, 6,676 cases in 1996, and 7,604 in 1997. During this time, Virginia reported 459 confirmed animal rabies cases in 1995, 612 cases of animal rabies in 1996, and 690 in 1997. Wildlife species--especially bats, foxes, raccoons, and skunks--are the most commonly reported animals with rabies, both in the United States and in Virginia. Eighty-six percent (86%) of Virginia's counties and cities have experienced raccoon rabies cases since the first case was confirmed in Virginia in 1978.

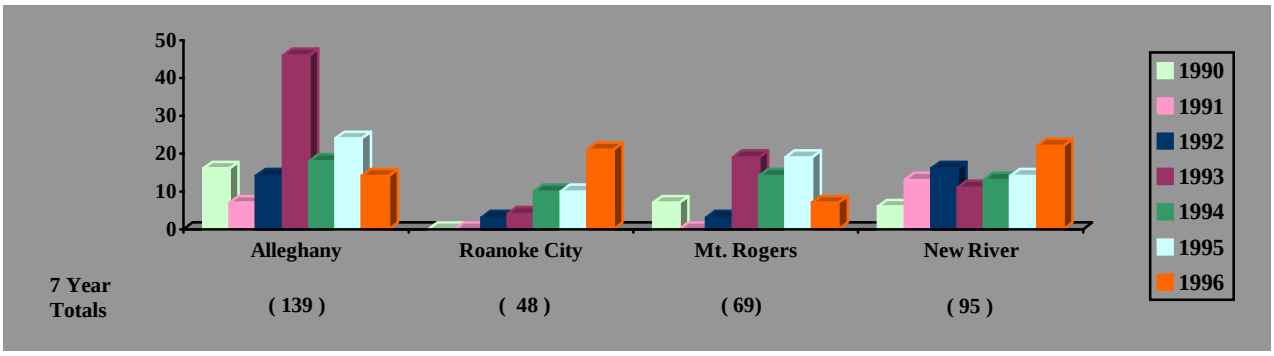
Bat rabies is enzootic in the United States. Nationally, there were 741 reported confirmed cases of rabid bats with cases reported by 46 of the 48 contiguous states during 1996. Between 1994 and 1997, there were 12 human deaths--four in each year--attributed to bat rabies in the United States. In the United States, between 1980 and 1997, 21 of the 36 humans who died from rabies were infected with a bat variant of the rabies virus. Several of the recent deaths in children had a history of a bat being seen in the bedroom while they slept. Recent epidemiological data suggests that seemingly insignificant physical contact with bats may result in viral transmission, even without a clear history of an animal bite. In Virginia, there were 17 cases of rabies in bats confirmed in 1996, and 22 confirmed cases in 1997.

The control of domestic animal rabies is considered an essential public health measure for protecting humans from rabies exposure. Despite the preponderance of rabid wild animals, domestic animals with rabies are more likely to expose humans than are wild animals. Prevention through public education and vaccination of domestic cats and dogs, along with a program to eliminate unwanted stray animals from the community, would reduce the risk of rabies exposure to the general public. Virginia law requires that cats and dogs receive rabies vaccination at four months of age by a licensed veterinarian. Thereafter, cats and dogs should receive regular boosters. In localities that require dog or cat licensing, pet owners must have proof of a current rabies vaccination in order to obtain a license and tag. Removal of stray cats and dogs can be enforced if owned animals are confined or kept on leash.

Each year, approximately 18,000 people in the United States are vaccinated against rabies following exposure to rabid or potentially rabid animals. Treatment is expensive, with the cost of vaccine alone ranging up to $1,500. For six consecutive years, the number of Virginians receiving post-exposure treatment increased--from 250 in 1990 to 574 in 1995, with a slight decrease to 510 noted in 1996. The

New River Health District accounted for 3.5% of all post-exposure prophylaxis administered statewide over the seven-year period from 1990 - 1996. The following chart illustrates the number of persons receiving rabies post-exposure prophylaxis for the New River Health District as compared to surrounding health districts.

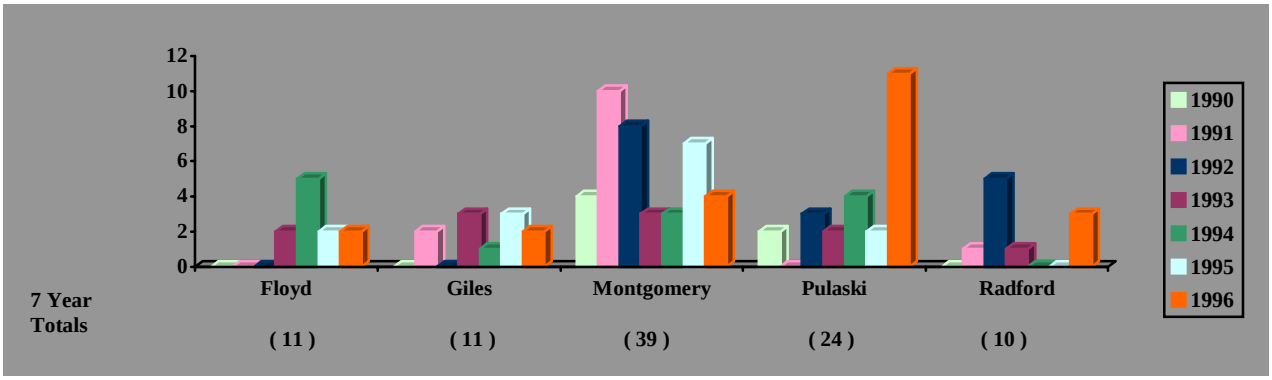
Number of Persons Reported to Have Received Rabies Post-Exposure Prophylaxis by Selected Health Districts 1990 - 1996



Source: *Local Zoonoses Data*, Office of Epidemiology, Virginia Department of Health, 1990-1997.

As can be seen on the following graph, Montgomery County accounts for the largest number (39) and percentage (37%) of the New River Health District's post-exposure prophylaxis cases for the 1990 – 1996 period. Between 1990 – 1996, the counties of Floyd and Giles each had 11 residents who received post-exposure prophylaxis, whereas Pulaski County had 24. Radford City only had 10 people who received the post-exposure prophylaxis series during this same seven-year time period. It should be noted that in 1996, Pulaski County surpassed the other localities of the New River Health District with 11 persons receiving rabies post-exposure treatment. Also in 1996, Radford City saw a 300% increase in the number of persons receiving rabies post-exposure prophylaxis from the previous year. In 1997, there were a total of 25 persons reported to have received rabies post-exposure prophylaxis in the New River Health District--three in Floyd County, three in Giles County, 12 in Montgomery County, six in Pulaski County, and one in Radford City. This represents a 44% increase from 1996 to 1997 in the number of persons receiving rabies post-exposure prophylaxis in the New River Health District, a 42% increase in Montgomery County and a 67% increase in Pulaski County.

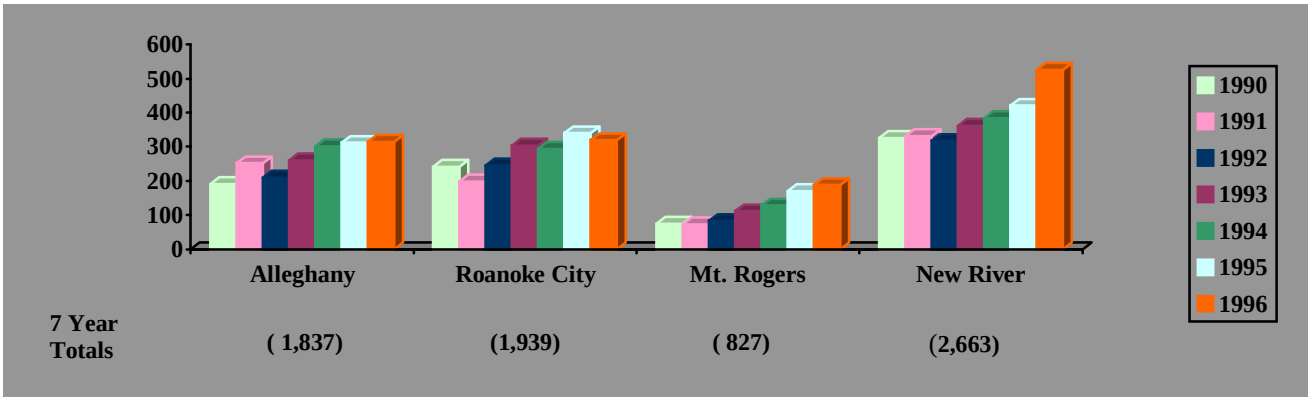
Number of Persons Reported to Have Received Rabies Post-Exposure Prophylaxis by Locality New River Health District 1990 - 1996



Source: *Local Zoonoses Data*, Office of Epidemiology, Virginia Department of Health, 1990-1997.

Increased numbers of rabid animals and new areas of animal rabies activity result in increased potential for human exposure and risk of developing rabies. The number of animal bites to humans reported in Virginia has increased from 12,264 in 1990 to 15,304 animal bites to humans in 1996--a 20% increase. The following graph demonstrates that--during the seven-year period 1990 – 1996--the New River Health District has consistently reported more animal bites to humans than surrounding areas. This is due to the District's 24-hour Hotline implemented in 1989. On the average, the District accounts for approximately 3% of all reported animal bites in the Commonwealth. During the same time period, in the New River Health District, Montgomery County reported 38% of the District's animal bites, whereas Pulaski County accounted for 33%. Giles County accounted for 14%, followed by Floyd County and Radford City at 8% and 7%, respectively. Radford City's low number of animal bites is again due, in part, to its local ordinance which requires domestic animals to be leashed at all times. Also, Radford City's aggressive animal control practices facilitate the removal of unwanted stray cats and dogs from the community. It is interesting to note that there were 16,313 animal bites reported in Virginia in 1997. The New River Health District investigated 581 animal bites in 1997. Of the District's total reported animal bites in 1997, Montgomery County reported 273 or 47%; Pulaski County followed with 162 or 28%; Giles County and Radford City each reported 51 or 9%; and Floyd County reported 44 or 8%.

Number of Animal Bites Reported by Selected Health Districts
1990 - 1996

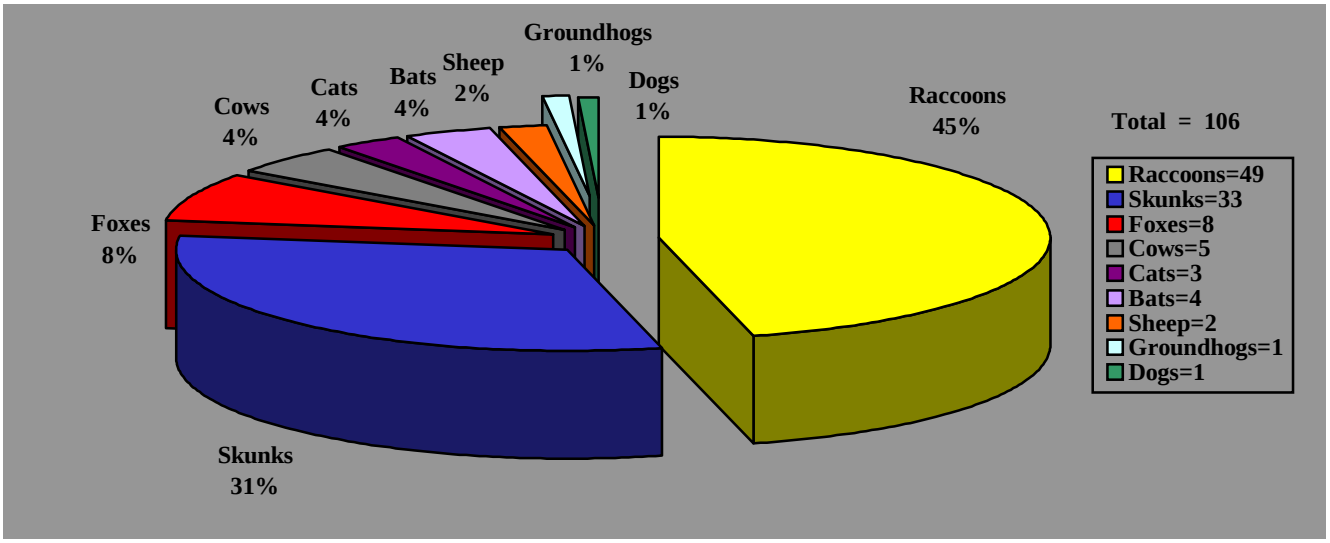


Source: *Local Zoonoses Data*, Office of Epidemiology, Virginia Department of Health, 1990-1997.

During the reporting period of 1990 - 1997, there were 106 confirmed cases of animal rabies in the New River Health District--three cases in cats and one case in a dog. Montgomery County had the greatest number of confirmed cases of rabies in 40 animals. Pulaski County had 28 rabid animals, Floyd County had 26, and Giles County had 12 rabid animals. During this same time period, Radford City did not have a single confirmed case of rabies. This may be due to a local ordinance requiring all dogs and cats to be leashed and vaccinated. It should be noted that the District usually sees the greatest number of confirmed rabies cases during the months of April through October.

The following chart depicts the percent distribution of animals confirmed with rabies in the District from the period of 1990 - 1997. In the New River Health District, the raccoon has been found to carry the disease more than any other animal tested (45%), followed by skunks (31%). This was true for Floyd, Giles, and Montgomery counties. Pulaski County was the exception, where there were 13 skunks and 11 raccoons found to have the disease. Giles County and Pulaski County were the only counties that had rabies in farm animals. Floyd County had a case of rabies in a groundhog.

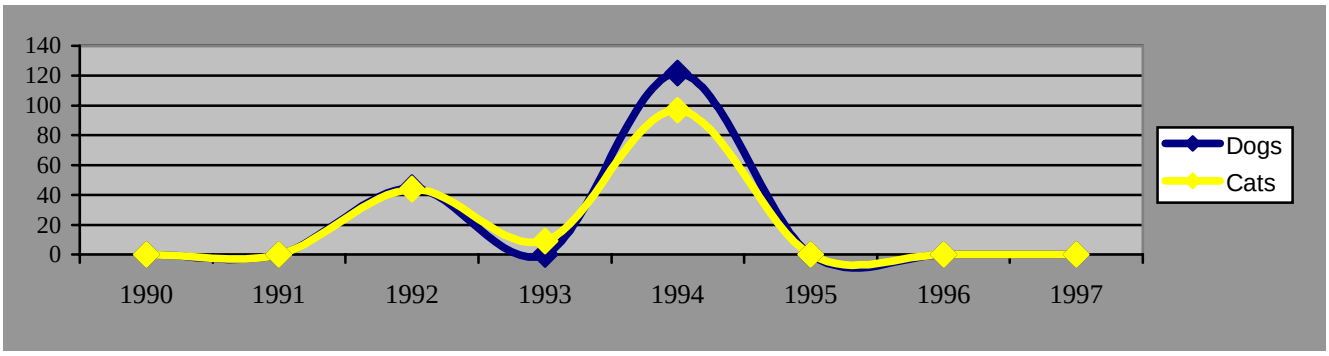
Percent Distribution and Number of Confirmed Cases of Animal Rabies
New River Health District
1990 – 1997



Source: New River Health District, 1997.

Rabies vaccination clinics offer an effective mechanism for pet owners to vaccinate their cats and dogs against rabies. These clinics can be held in locations throughout the District convenient to owners of domestic pets and, usually, at a reduced cost. Since 1990, there has not been a District-wide community-sponsored clinic for the vaccination of domestic cats and dogs in the New River Health District. The following chart shows the number of cats and dogs vaccinated in individual community-sponsored clinics held in Floyd and Giles counties in 1992 and 1994, respectively. During this same time period, no clinics were sponsored in Montgomery County, Pulaski County, or Radford City. Surrounding health districts have been successful in sponsoring numerous rabies vaccination clinics.

Number of Cats and Dogs Vaccinated in Community-Sponsored Clinics
Floyd and Giles Counties Only
1990 - 1997



Source: New River Health District, 1997.

Owners of domestic dogs are required in all localities of the New River Health District to obtain a rabies vaccination before purchasing tags. In 1994, Giles County adopted a local ordinance requiring cats to be tagged, but rescinded the ordinance in 1996. At the present time, there are no local ordinances requiring cats to be tagged; therefore, they often are not vaccinated routinely like dogs.

A recent research study by a student from the Virginia-Maryland Regional College of Veterinary Medicine, interning at the Montgomery County Health Department, showed that in Montgomery County between 1992 and 1996, 15.6% (100/640) of all animal bite reports were attributed to stray or feral cats. In contrast, stray dogs accounted for only 4.7% (30/640) of reports. Furthermore, stray cat exposures accounted for over 60% of the recommendations for post-exposure rabies treatments between 1992 and 1996. Statistical analysis of this research data shows that 64.9% of owned cats involved in bite or scratch reports in Montgomery County were not vaccinated or did not have current rabies vaccinations at the time of the incident. This means that both stray and owned cats in this area are at risk for rabies; therefore, humans are also at risk because of their close association with cats. Human exposures to domestic animals constitute a significant portion of bite and scratch reports in Montgomery County each year. In fact, 73% of all animals submitted for rabies testing between 1992 and 1996 were classified as domestic animals or livestock. Similarly, 98% of potential exposures to humans were caused by domestic species and livestock. Stray and feral cats caused a substantial proportion of human exposures and constituted 14.3% of animals submitted for rabies testing. In contrast, stray and feral dogs represented a much smaller percentage (4.7%) of domestic animals tested. Reducing the number of potential exposures by stray cats would likely reduce the overall number of exposures. For example, if the number of exposures to stray cats could be reduced by 75%, it would theoretically reduce the overall number of potential exposures by 11.7%. Cats and dogs caused 96.6% of potential exposures and constituted 49.6% of all animals submitted for rabies testing in Montgomery County during this same time period. For owned animals involved in a potential exposure, 28% of dogs and 64.9% of cats were either unvaccinated or their vaccination had expired.

The greatest risk for human rabies exposure comes from domestic animals that contract the disease. Although hundreds of rabid raccoons and skunks were reported in Virginia in 1995, human exposure to these animals was relatively rare. The statistics on cats make it clear that more efforts need to be directed toward controlling stray and feral cats and improving vaccination rates for all cats. Furthermore, education must continue to alert people to the fact that they should not come in contact with stray or wild animals, thus risking exposure of themselves to the rabies virus. More efforts must be made to establish facilities for the removal of unwanted stray cats in our communities. The need to keep our pet cats and dogs currently vaccinated against rabies is essential to buffer ourselves and protect our pets from contracting the disease. Pets that roam free, particularly in rural areas, are more likely to be exposed to rabies. Additionally, people should not feed unwanted stray animals because these animals have a higher potential for having rabies.

What you can do:

- **Encourage local authorities to adopt local ordinances requiring cats to be vaccinated against rabies.**

- **Localities need to remove unwanted stray cats from the community.** This reduces the potential for animal to human exposures and, subsequently, reduces the number of people who require post-exposure prophylaxis.

- **Do not approach a stray or wild animal which appears to be sick or injured.** Call your local animal control officer or game warden.

- **Keep routine rabies vaccinations current for all your domestic pets.**

- **Do not leave food for your pet outside. After your pet has eaten, bring the dish inside.** Uneaten food attracts stray and/or wild animals that may be carrying the rabies virus.

- **Report all animal bites to your local health department immediately.**

- **Support spaying and neutering programs in your community.**

Lead Poisoning

Concern about the health effects of environmental contaminants is at an all-time high. Lead poisoning, one of the most preventable childhood health problems, is of particular interest because lead is detectable and can be removed from the environment. Lead provides no known benefit to humans. Yet, it can produce harmful effects in the body--the kidneys, the nervous system, the reproductive system, and may cause high blood pressure--lead is especially harmful to the developing brains of unborn babies and young children.

Children are at higher risk for lead poisoning than adults because they have more hand-to-mouth activity and because their bodies more readily absorb lead than do adults. Regardless of race or ethnic background, family economic background, or living in a city, suburb, or rural area, lead may harm children. Lead is very harmful and affects a child's mental and physical health. Most children show no symptoms, even at high blood lead levels. Symptoms, if they occur, include stomach pains, irritability, fatigue, frequent vomiting, constipation, headache, poor appetite, clumsiness, weakness, and sleep disturbances. Consequently, if symptoms occur, they may be mistaken for influenza or other illnesses. Elevated blood lead levels may result in learning disabilities, behavioral problems, mental retardation, seizures, coma, and even death.

Objective: Reduce the incidence of children ages 9 years and younger with blood lead levels exceeding 15 micrograms per deciliter (15 ug/dL) to 13 per 100,000 population.

Elevated blood lead levels in children have been reportable since July 1, 1994. Although blood lead levels (BLLs) in children have been declining, lead exposure remains a significant public health problem with national estimates from 1988-1991 indicating that 1.7 million children had elevated blood lead levels. In comparison, it is estimated that 40,000 of Virginia's children have elevated blood lead levels. From 1994 – 1996, the New River Health District reported 10 cases of elevated blood lead levels in children from birth to age nine. For the half year of reporting in 1994, New River reported six cases--one in Floyd County and five in Radford City. In 1995, the only reported cases in the New River Health District were two in Pulaski County. In 1996, there were two cases of elevated blood lead levels reported in children--one in Montgomery County and one in Pulaski County. Giles County had no cases of confirmed elevated childhood blood lead levels during this period.

Significant progress has been made in the United States in reducing rates of childhood lead poisoning by implementing environmental standards that removed lead from gasoline, paint, and plumbing; water treatment; removing lead solder from food cans; and reducing lead-based paint hazards in children's homes. Despite this progress, lead-based paint in older homes--that is deteriorating, creating dust and paint chips, or is disturbed during renovation or remodeling--and lead-contaminated soil are the remaining major sources of lead exposure. Other sources include operating abandoned industrial sites and smelters; utilizing leaded ceramics for cooking, eating, or drinking; and exposure to clothing with lead dust.

Unlike many environmental health problems, lead contamination is often found in the home. About 74% of privately owned and occupied housing units in the United States built before 1980 contain lead-based paint. In the New River Valley, each locality has a historical district of older "period homes" which are being restored. Of the 51,104 housing units in the New River Health District, 69% or 35,187 are single family units that were built before 1980.

Montgomery County has seen the greatest increase of single family dwelling units with almost 3,500 or 35.5% within the ten-year period, while Radford City has seen the smallest increase with 449 units or 8.5% during the same time period. During this time, 1,500 single-family units were constructed. By 1970, there were 27,763 single-family homes built in the New River Valley. These homes built before 1980 contain lead-based paint, the single largest source of lead besides leaded fuel. The New River Valley has a very small number of cases of childhood elevated blood lead levels compared to the rest of Virginia due in part to the fact that a small number (2.4%) of all single family dwelling units in the Commonwealth are in the New River Valley. The following table reflects housing activity in the New River Health District from 1970 to 1980.

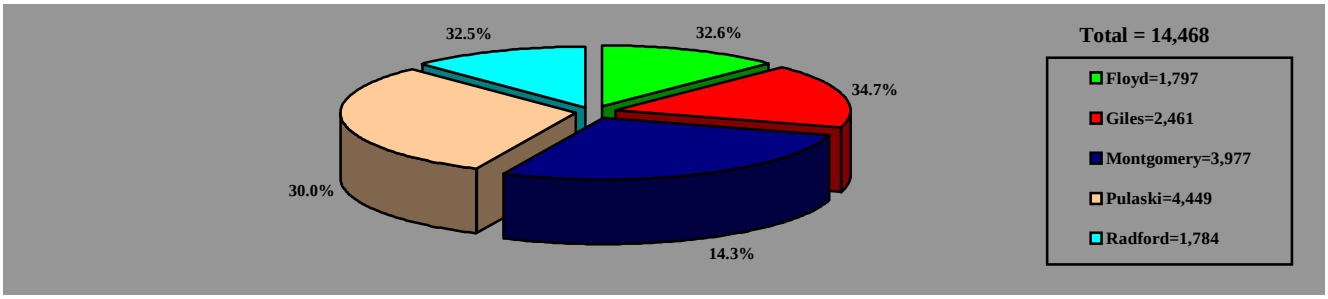
Type of Housing Units Constructed in 1970 and 1980
New River Health District and Localities
1997*

Locality	*Year*	*Single Family*	*Multi-Family*	*Mobile Home*
Floyd	1970	3,332	82	184
	1980	4,099	141	539
Giles	1970	4,905	367	346
	1980	5,566	390	684
Montgomery	1970	9,015	3,747	1,792
	1980	12,514	7,137	2,684
Pulaski	1970	7,957	1,061	871
	1980	10,005	1,992	1,191
Radford	1970	2,554	699	34
	1980	3,003	1,045	114
District Total	1980	35,187	10,705	5,212

* Based on 1990 Census.
Source: New River Valley Planning Commission, June 1992.

The older the house, the more likely it is to contain lead-based paint and to have a higher concentration of lead in the paint. Housing built before 1950 poses the greatest hazard to children because it is much more likely to contain lead-based paint than newer housing. In the United States, 26.9% of the housing units were built prior to 1950; and 19.3% of housing units in Virginia were built before 1950. Interestingly, 23.9% of housing units in the New River Health District were built before 1950. Giles County has the highest percent (34.7%) of housing units built before 1950, followed by Floyd County (32.6%), Radford City (32.5%), and Pulaski County (30.0%). It should be noted that all of the District's localities--except Montgomery County (14.3%)--exceed both the State's and Nation's percentages of housing units built before 1950. The number and percent of housing units in each locality of the New River Health District built before 1950 can be seen on the following graph.

Number and Percent of Housing Units Built Before 1950 by Locality
New River Health District
1997*



* Based on 1990 Census.
Source: New River Valley Planning Commission, June 1992.

Childhood blood lead screening is an important element in eliminating childhood lead poisoning. Screening yields identification of children who need individual interventions to reduce their blood lead levels. To determine lead exposure, virtually all children should be screened. Currently, recommendations of the Centers for Disease Control and Prevention (CDC) for lead screening suggest that all children ages one and two who live in housing built before 1950 and all children who receive services from public assistance programs for the poor such as Medicaid or the supplemental food program for Women, Infants, and Children (WIC) be screened. All other children are to answer a brief personal questionnaire, and those who answer "yes" to any one question are screened. A basic personal risk questionnaire includes the following questions:

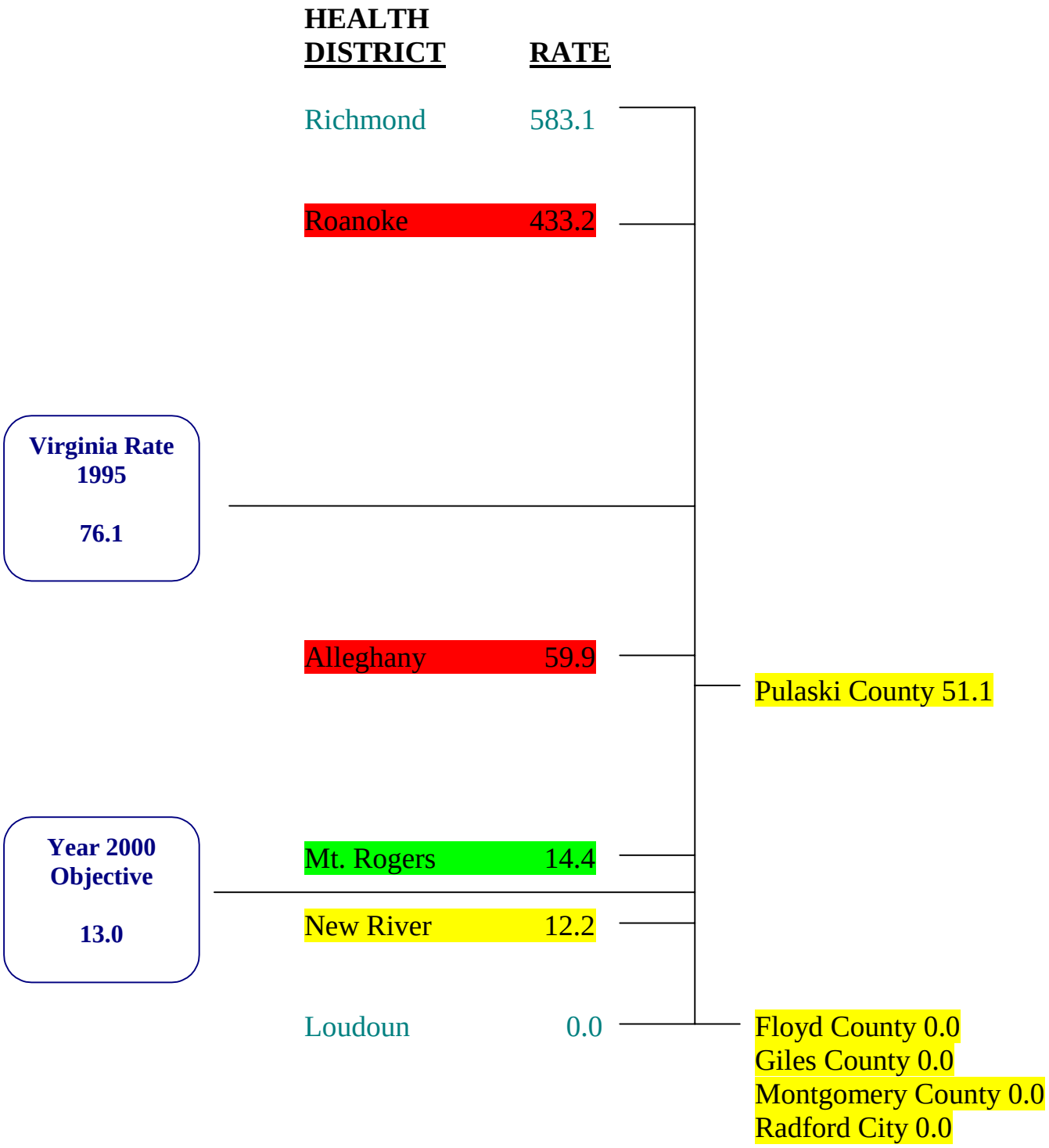
1. Does your child live in or regularly visit a house that was built before 1950?
2. Does your child live in or regularly visit a house built before 1978 that is being or has recently been renovated or remodeled (within the last 6 months)?
3. Any other locale specific questions such as:
   (a) Does your child live with an adult whose job or hobby involves exposure to lead?
   (b) Does your child have a brother, sister, housemate, or playmate who is being treated for lead poisoning?

Blood lead screening involves a simple fingerstick procedure for blood collection; the sample is then sent to a laboratory for analysis. Children with positive screening results (blood lead levels greater than 10 ug/dL) require additional blood work, clinical evaluation, and appropriate follow-up.

What you can do:

- **Be knowledgeable about the sources and dangers of lead poisoning.**
- **Keep children away from peeling or chipping paint and surfaces painted with lead-based paint.** Use a mop or wet cloth on hard surfaces. Vacuuming hard surfaces scatters the lead dust. Wash children's hands and faces before eating. Wash toys and pacifiers frequently.
- **Ensure that all children ages six months to two years receive a blood lead screening test.**
- **Ensure that any child with a blood lead level of 10 ug/dL or more receive clinical evaluation and appropriate follow-up.**
- **Encourage property owners, developers, and housing administrators to delead properties when renovating.**

Lead Poisoning Rate Per 100,000 Children Ages 0-9 Years
Selected Health Districts, New River Health District and Localities
1995



Recreational Water Quality

Objective: Reduce potential risks to human health from surface water, as measured by a decrease to no more than 15% in the proportion of assessed rivers, lakes, and estuaries that do not support beneficial uses, such as fishing and swimming.

All rivers, streams, and lakes contain naturally occurring algae, bacteria, viruses and parasites. Microbiological organisms come from plants, animals, and sometimes, human sewage. The concentrations of such organisms may be increased by agricultural, industrial, and residential activities. Agricultural and urban runoff, coupled with improperly or partially treated sewage, can be major contributors to microbiological pollution. The types and numbers of such organisms are dependent on what runs into or is dumped in the water. The water flow, temperature, level of acidity, chemical composition, amount of organic material, and other factors can also influence how many and what kind of organisms are present.

Most of the organisms in Virginia's rivers and lakes probably do not cause human illness or are in such low levels they will not make anyone sick, but there is no way to be sure. Because natural bodies of water are so changeable, especially rivers, officials can only make general statements about the health risk of certain bodies of water; they cannot say exactly what the condition of a specific body of water is at any particular time. Increased pollution may occur after rain washes contaminants from land surfaces. Water that does not flow freely may concentrate pollutants that are already present.

Tests on water for viruses, parasites, and bacteria that cause illness are difficult, time consuming, and costly. For these reasons, a national standard test for fecal coliform bacteria is used as an indicator of possible contamination from human waste. However, non-disease causing fecal coliform bacteria can also come from animals or multiply readily in certain types of water, so high levels of them do not necessarily mean the water is unsafe. Samples from bodies of water that exceed the standard only indicate the potential for human sewage to be present. However, the higher the fecal coliform level, the more likely it is that sewage is present and the greater the risk of disease causing organisms being present. On the other hand, water that tests negative for fecal coliform bacteria is not necessarily risk-free.

Most of the water-borne organisms that cause disease affect the digestive tract and, therefore, are acquired by ingesting contaminated water. Less commonly, skin, ear, and eye infections can result from contact with surface water. Although recreational water users may inadvertently swallow water, deliberately drinking from rivers, streams, or lakes is never recommended. Persons whose immune systems are compromised should be very careful to avoid swallowing water from any river, stream, or lake.

Although there are a number of diseases that can potentially come from recreational water, reported outbreaks of such diseases have been rare in Virginia. In 1979, eight children who drank water from a creek became ill; and 72 persons who used a community swimming pool had a suspected viral infection. In 1992, an outbreak of shigellosis (a bacterial illness that causes diarrhea) was associated with people swimming in the shallow area of a lake.

In addition to risks from infectious organisms, some waters may be contaminated with toxic substances. They create more of a risk for persons eating fish from those waters than for swimmers. Health advisories, which are issued when these waters are identified, may limit or prohibit consumption of fish. The public is notified via warning signs and through the brochure on fishing regulations provided by the Department of Game and Inland Fisheries.

Data on recreational water quality are collected and monitored by the Department of Environmental Quality (DEQ) across Virginia to comply with the standards set forth by the Clean Water Act of the Environmental Protection Agency (EPA). DEQ publishes its findings every two years in a report to Congress and the EPA which is designated as the 305(b) Report. EPA now requires that a list of all waters that do not meet standards for fishing or swimming be made public. This list is called the 303(d) Report. DEQ has released its 1996 303(d) Report of water quality in Virginia's natural bodies of water which covers the monitoring period of April 1, 1993, through March 31, 1995, along 29,243 miles of rivers and 163,688 square miles of lakes and estuaries in Virginia. The data from the more than 1,110 monitoring stations found that 95% of Virginia rivers and streams monitored by DEQ over the past two years met all water quality standards. In those waters that did not meet standards--approximately 1,456 miles, or 5.0%--the leading cause of pollution was runoff from farms, cities, and other nonpoint sources (NPS). Of Virginia's 251 publicly owned lakes, only one did not meet water quality standards--Lake Trashmore in Virginia Beach, which failed bacteria standards because of a flock of resident ducks.

Virginia has nine major river basins with an estimated 49,220 miles of perennial streams, 2,500 square miles of estuaries, and over 150,000 acres of publicly owned lakes and reservoirs. The following table lists each river basin along with point and nonpoint sources of impairments and the number of miles affected. The New River Basin has 69.56 miles of impaired waters which represents 4.8% of the approximate 1,456 total miles of impaired waters identified in Virginia.

Summary of Impaired Waters by River Basin in Miles
Virginia
1996

By Basin	*NPS Agriculture*	*NPS Urban*	*NPS Urban & Agriculture*	*NPS Acid Mine Drainage*	*NPS Other*	*Combined Sewer Overflow and NPS Urban*	*Point Source*	*Source Not Known*	*Total Miles*
Potomac & Shenandoah River	270.6	79.2	18.3	0.0	0.0	0.0	1.4	24.4	393.9
James River	184.8	56.7	0.0	0.0	1.0	37.9	2.8	55.9	339.0
York River	2.6	0.0	0.0	0.0	0.0	0.0	0.0	16.2	18.8
Roanoke River	127.2	54.1	19.5	0.0	6.0	0.0	8.9	69.3	285.0
Chowan River	9.8	0.0	0.0	0.0	3.9	0.0	1.1	2.7	17.5
Tennessee & Big Sandy River	16.5	27.8	26.2	44.0	168.0	0.0	7.1	0.0	289.7
Small Coastal & Chesapeake Bay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.3
Rappahannock River	21.7	0.0	7.6	0.0	0.0	0.0	0.0	6.7	36.0
New River	33.5	4.6	11.2	0.0	8.1	0.0	6.5	5.7	69.6
All Basins-Totals	666.7	222.4	82.8	44.0	187.0	37.9	27.8	187.2	1,455.8

Source: *303(d) Total Maximum Daily Load Priority List Report*, Virginia Department of Environmental Quality, May 1997.

The New River Health District lies primarily in the New River Basin, with a portion of Montgomery County lying in the Roanoke River Basin. The following table--from DEQ's 1996 303(d) Report--lists, by county, the name of each impaired stream, the number of miles affected, the source of impairment, and the priority ranking (low, medium, high) based on the severity of the impairment and the uses to be made of the waterbody. It is interesting to note that the New River was not listed as an impaired body of water. There were no impaired waters identified in Floyd County, Giles County, and Radford City. Pulaski County had two impaired streams, while Montgomery County had the most with four impaired streams, one of which is located in the Roanoke River Basin.

Summary of Impaired Waters
New River Health District
1996

Locality	*Stream Name**	*Number of Miles*	*Source of Impairment*	*Priority Ranking*
Floyd	No impaired waters identified			
Giles	No impaired waters identified			
Montgomery	Crab Creek	10.4	NPS runoff agriculture, urban	Medium
	Mill Creek	5.9	Unknown	Medium
	Stroubles Creek	9.0	NPS runoff agriculture	Low
	Wilson Creek**	5.0	NPS runoff agriculture, urban	Low
Pulaski	Peak Creek	4.6	NPS runoff channelization	Low
	Back Creek	17.4	NPS runoff agriculture	Low
Radford	No impaired Waters identified			

* Located in the New River Basin.
** Located in the Roanoke River Basin.
Source: *303(b) TMDL*, Virginia Department of Environmental Quality, May 1997.

The New River Health District and its localities, as well as Virginia, are well below the national objective in regard to recreational water quality. For the New River Health District and its localities and Virginia to maintain recreational water quality standards below the Year 2000 Objective, a broad range of actions, including such steps as modifying farming techniques to minimize pesticide and fertilizer runoff, changing lawn watering and fertilizer practices, improving community waste water treatment, and reducing releases of toxic chemicals, will be required. As with many of the environmental health objectives, this objective to reduce contamination of surface water cannot be met without concerted efforts by individuals, corporations, communities, and governments. National, State, and local reporting under this objective will evolve over the decade as states improve their ability to monitor, assess, and report water quality.

What you can do:

- **Do not swim in water that looks stagnant, muddy, or smells unpleasant.**
- **Try to avoid swallowing river, stream or lake water, especially if you are immunocompromised.**
- **Avoid swimming several days after a heavy rainfall.**
- **Prevent broken skin from directly contacting recreational water.**
- **Do not drink alcoholic beverages or use drugs when swimming or boating.**
- **Avoid floodwaters that can carry hidden debris and cause injury.**
- **Do not add to the risk; use appropriate toilet facilities.**
- **Wear a personal flotation device, especially if you are not a strong swimmer.**

Summary

It is important for New River Valley residents to become aware of the quality of their water supplies and take any necessary corrective action. A comprehensive program of monitoring water quality trends will need to be continued to help in making land use decisions which will impact the future of water quality. The potential for impact on water quality can be seen in the increased on-site wastewater disposal permitting activity in the New River Health District. Increased rural development has called for the increased discharge of domestic sewage to subsurface disposal systems. Radford City has the highest percent of its residents on public water and public wastewater systems followed by Montgomery, Pulaski, Giles, and Floyd counties.

The successful control of rabies is based upon the application of three essential principles:

1. Impound all stray and ownerless cats and dogs.
2. Maintain up-to-date rabies vaccinations on all pet cats and dogs.
3. Control wildlife population, i.e., foxes, skunks, raccoons, when that population is serving as a reservoir of rabies.

The adoption of local ordinances, which in some way encompasses the three broad principles stated above, is the key to effective rabies control. It must be remembered that no matter how well a program of control is drafted, it does not have its desired effect unless a well-planned educational program goes along with it.

Radford City has pioneered the District's only animal ordinance requiring pet owners to keep animals from running at large. Positive results of the ordinance are clearly reflected by the absence of a confirmed case of rabies in Radford City from 1990 - 1997. Floyd, Giles, Montgomery, and Pulaski counties need to become more involved not only in removing unwanted stray and feral cats from their communities but also in providing adequate facilities to house stray and feral cats. A cat ordinance and cat-tagging program is needed in each locality.

Childhood blood lead poisoning is another important environmental protection concern. Although blood lead screening is a simple procedure, it is often overlooked as an essential component of preventive child health services. Health care providers should place more emphasis on screening all children and identifying and educating the parents of those children who are at the highest risk for lead poisoning.

Recreational water quality indicators in the New River Health District and its localities, as well as in Virginia, are below the national objective. Residents who use any river, stream, or lake water for recreational purposes are urged to be cautious and to use common sense about contact with such water. Although the cleanliness and quality of Virginia's surface water continually improves, officials from DEQ and VDH caution that it is impossible to guarantee that any natural body of water is free of risk from disease-causing organisms or injury.

These major environmental objectives are just the tip of the iceberg when addressing environmental concerns within the New River Health District. There are other issues on the horizon that have not been addressed by this report. These include emerging foodborne infections such as *E. coli 0157:H7*; the issues and concerns of proper food handling and sanitation; tourist establishment sanitation; swimming pool, spa, and hot tub sanitation; radiological, solid, toxic and hazardous waste disposal concerns; and air pollution and air quality issues. As residents of the New River Health District look to the future, they will ask and expect that these concerns be addressed in such a way as to provide assurances that their environment is being protected at all times.

Our community can make a difference, but it will take the involvement of everyone working together for a better environment in which we all live and work. Local citizen groups, Boards of Supervisors, City Councils, civic groups, local hospitals, politicians, mayors, the media, teaching institutions, other agencies, and a myriad of concerned individuals will ensure that these objectives and concerns are taken into consideration when decisions are made, not only now, but in the years to come.